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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/935,939	08/23/2001	Robert Edward Galbraith	IBM / 67DV1	1833

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WOOD, HERRON & EVANS, L.L.P.
2700 Carew Tower
Cincinnati, OH 45202

EXAMINER

PEUGH, BRIAN R

ART UNIT	PAPER NUMBER
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2187

DATE MAILED: 10/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/935,939

Applicant(s)

GALBRAITH ET AL.

Examiner

Brian R. Peugh

Art Unit

2187

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-30 and 45-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-25,30,45-49 and 54-57 is/are rejected.
- 7) ☒ Claim(s) 26-29 and 50-53 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This Office Action is in response to applicant's communication filed September 17, 2002, in response to PTO Office Action dated June 12, 2002. The applicant's remarks and amendment to the specification and/or claims were considered with the results that follow.

Claims 21-30 and 45-57 have been presented for examination in this application. In response to the last Office Action, claims 21-23 have been amended. Claims 45-57 have been added.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21-24, 30, 45-48, and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over McNutt et al. (US# 5,649,153) and Johnson et al. (US# 5,577,236).

Regarding claims 21 and 45, McNutt et al. teaches a DASD caching management system. A cache (205) stores data pulled from the DASD drives (209). A cache directory (219) attached to the cache is used to detail what data has been read

into the cache from the DASD drives, such that the directory maintains a listing of where the data is stored in the cache (col. 3, lines 51-53 & 59-62). Upon a cache read hit, data is sent from the cache to the CPU (111) (requestor). Upon a cache miss, data is read from a DASD into the cache (col. 4, lines 62-65). As data is added and removed from the cache, the amount of cache space available inherently alters, or affects, the number of data listings in the cache directory.

Regarding claims 22, 23, 46, and 47, when data is removed from the cache, the cache directory removes its associated directory listing. Thus, the new directory listing would contain fewer directory entries and portray an even greater amount of cache space that is available for use. The opposite would occur when new data is added to the cache, in that the new directory listing would contain fewer available entries and the cache itself would have less space for data storage. These operations are inherent to any caching system. Should data need to be pulled from a DASD drive, the controller (203) checks the directory for available space for the data to be placed into the cache.

Regarding claims 24 and 48, the caching system of McNutt et al. teaches monitoring data accesses to data stored in the cache (col. 4, lines 56-58).

Regarding claims 30 and 54, the caching system of McNutt et al. also teaches monitoring data accesses to data not currently stored in the cache (col. 5, lines 24-55).

The difference between the claimed subject matter and that of McNutt et al. is that the claims 21-23 and 45-47 are directed toward a change in the overall total memory of the cache in a physical sense, rather than a dynamic sense. Johnson et al. teaches a memory controller for reading data from SRAM modules. The memory

SRAM simms are used to comprise the cache memory, and can be added and removed. The memory controller is in charge of accounting for the change in total cache memory space (due to the increase or decrease of the number of SRAM simms) and directs the read or write operations accordingly (col. 2, lines 19-41; col. 2, line 60 – col. 3, line 2). Therefore it would have been obvious to one of ordinary skill in the art having the teachings of McNutt et al. and Johnson et al. before him at the time the invention was made to modify the cache allocation system of McNutt et al. to include the physical addition/subtraction simm system of Johnson et al., because then the additional simms would facilitate a larger cache, which in turn would accommodate more data that was able to be accessed quicker than the slower storage devices.

Claims 25 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over McNutt et al. (US# 5,649,153), Johnson et al. (US# 5,577,236), and Mayfield (US# 5,737,565).

The difference between the claimed subject matter and McNutt et al., disclosed supra, is that the claim recites that monitoring data accesses is done in connection with and LRU queue. Mayfield teaches monitoring a sequence of cache misses, whereupon that an LRU filter queue (502) is used in conjunction with the monitoring step (abs.; Figure 5). Therefore it would have been obvious to one of ordinary skill in the art having the teachings of McNutt et al., Johnson et al., and Mayfield before him at the time the invention was made to modify the caching systems of McNutt et al. and Johnson et al.

to include the LRU scheme of Mayfield because then items which receive how hit-ratios can be removed and replaced with items from the LRU cache, as taught by Mayfield.

Claims 55-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over McNutt et al. (US# 5,649,153), Johnson et al. (US# 5,577,236), and Tanenbaum.

McNutt et al. teaches a DASD caching management system. A cache (205) stores data pulled from the DASD drives (209). A cache directory (219) attached to the cache is used to detail what data has been read into the cache from the DASD drives, such that the directory maintains a listing of where the data is stored in the cache (col. 3, lines 51-53 & 59-62). Upon a cache read hit, data is sent from the cache to the CPU (111) (requestor). Upon a cache miss, data is read from a DASD into the cache (col. 4, lines 62-65). As data is added and removed from the cache, the amount of cache space available inherently alters, or affects, the number of data listings in the cache directory. Johnson et al. teaches a memory controller for reading data from SRAM modules. The memory SRAM simms are used to comprise the cache memory, and can be added and removed.

The difference between the claimed subject matter and that of McNutt et al. and Johnson et al. is that the claim recites that the caching operation function according to a program. Tanenbaum teaches that hardware and software are logically equivalent, and that any operation performed by one can also be executed by the other (page 11). Tanenbaum also recites that the software can be represented and stored on various media, such as recordable magnetic tape media (claim 57). Regarding claim 56, the

transmission type media as claimed and described as communications links in the specification relates to communication buses and I/O hardware needed for reading such recordable media as the magnetic tape media. Although not explicitly stated by Tanenbaum, such buses and I/O hardware would be inherent to a computer system implementing recordable tape and other recordable media drives. Therefore it would have been obvious to one of ordinary skill in the art having the teachings of McNutt et al., Johnson et al., and Tanenbaum before him at the time the invention was made to modify the caching systems of McNutt et al. and Johnson et al. to include the software implementation of Tanenbaum because then a decrease in hardware material costs could be gained by implementing an operation in software.

Allowable Subject Matter

Claims 26-29 and 50-53 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claims 21-24, 30, 45-48, 54 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

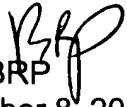
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian R. Peugh whose telephone number is 703-306-5843. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm. The examiner can also be reached on alternate Friday's from 7:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Do Yoo, can be reached on (703) 308-4908. The fax phone number for the organization where this application or proceeding is assigned is 703-746-7239.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9600.


DY/BRP
October 8, 2002


DO HYUN YOO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100